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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,276	10/29/2003	Nicolas B. Cobb	MEGC121783	6511
26389	7590	11/16/2006	EXAMINER	
CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347			OCHOA, JUAN CARLOS	
			ART UNIT	PAPER NUMBER
			2123	

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/696,276

Applicant(s)

COBB, NICOLAS B.

Examiner

Juan C. Ochoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 6,7 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-13 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                 |                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                            | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/9/04</u> . | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1–5 and 8–12, drawn to simulating an electrical system, classified in class 703, subclass 13.
  - II. Claims 6, 7, and 13 drawn to a mask/reticle used for the creation of one or more layers of an integrated circuit, a file describing a layer of an integrated circuit, and a file describing objects to be created via photolithography, classified in class 716, subclass 19.
2. The inventions are distinct, each from the other because of the following reasons:
3. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the mask/reticle and/or a file describing a layer of an integrated circuit can be created and/or prepared by another OPC.
4. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.
5. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Rodney Tullett on X/3/06 a provisional election was made without traverse to prosecute the invention of Invention I, claims 1–5 and 8–12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 6, 7, and 13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Claims 1–13 are pending in this application, claims 1–5 and 8–12 have been elected with out traverse, claims 6, 7, and 13 have been withdrawn as being directed to the non–elected invention.

***Information Disclosure Statement***

8. The information disclosure statement filed 2/9/04 contains a large number of references, and some of them miss–referenced, submitted for consideration that appear to be cumulative and are consistent with the progress in the art. In view of the number of references in this application, the Applicant is requested to identify any specific references, features, sections or figures in the references cited which are believed to have particular significance in the prosecution of this application or which are considered material to the patentability of the pending claims, for further consideration by the Examiner.

9. The information disclosure statement filed 2/9/04 lists NPL "SPIE Proceedings, 19th Annual Symposium on Photomask Technology 3873.21, Editors: Abboud, F. et al.,

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1999". This information referred to has not been considered since such NPL is non-existent. This reference refers to "Wednesday 15 September 1999. TABLE OF CONTENTS. Volume 3873 -- 19th Annual Symposium on Photomask Technology Frank E. Abboud, Brian J. Grenon, Editors December 1999, Conference Location: Monterey, CA, USA, Conference Date: 15 September 1999" as per SPIE—The International Society for Optical Engineering.

10. The information disclosure statement filed 2/9/04 lists NPL "SPIE Proceedings, Optical Microlithography LY2726: 15, Editors: Fuller, G.E. et al., 1996.". This information referred to has not been considered since such NPL is non-existent. This reference refers to "Wednesday 13 March 1996, TABLE OF CONTENTS, Volume 2726 -- Optical Microlithography IX, Gene E. Fuller, Editor June 1996, Conference Location: Santa Clara, CA, USA, Conference Date: 13 March 1996 " as per SPIE—The International Society for Optical Engineering.

### ***Drawings***

11. The drawings are objected to because of the following informalities:
12. As to Figure 8, logic box 850 includes the misspelled term "UPC".
13. Appropriate correction is required.
14. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the informal drawings of Figs. 9, 10A-10E, and 11A-11B are not of sufficient quality.
15. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new

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drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

16. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because:

17. As to Figure 7, page 12, line 17 of the specification refers to "600" and not reference characters 600a, 600b, and 600c as labeled in Figure 7.

18. As to Figure 7, it does not include the following reference sign(s) mentioned in the description: 714.

19. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

20. The disclosure is objected to because page 1, line 6 contains application cross-references in need of updated information. Applicant is required to update such information.

***Claim Rejections - 35 USC § 101***

21. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

22. Claims 5 and 12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

23. Specifically, claims 5 and 12 claim computer readable medium; and page 14, lines 5–6 of the specification recite “or from a wireless or wired communication link” as computer readable medium. Examiner equates a wireless or wired communication link computer readable medium as a carrier wave, which fails to fall into one of the categories of invention.

***Claim Rejections - 35 USC § 102***

24. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

25. Claim 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Mukherjee, Maharaj (Mukherjee hereinafter), U.S. Patent 6,649,309.

26. As to claim 8, Mukherjee discloses a method for fragmenting polygons that describe structures of an object to be created via photolithography comprising: performing an initial fragmentation that divides a polygon into a number of edge segments that extend around the perimeter of the polygon (see col. 2, lines 60–62); computing a simulation of how the structures will be printed on a wafer under defined process conditions (see col. 6, lines 42–43 and “alternatively run aerial image simulation” in Fig. 4, 2<sup>nd</sup> item); and using the results of the simulation to adjust the fragmentation of the polygons (see col. 2, lines 47–49).

### ***Claim Rejections - 35 USC § 103***

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

28. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.



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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

29. Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukherjee.

30. As to claim 1, Mukherjee discloses a method of preparing a circuit layout for optical and process correction (OPC) (see col. 2, lines 40–41), comprising: receiving a description of a layer of an integrated circuit that is defined as a number of polygons (see Fig. 9, 1st item); fragmenting a polygon into a number of edge segments that extend around the perimeter of the polygon (see col. 2, lines 41–43); computing a simulation of the layout that estimates light intensity values in an area of at least one of the edge segments (see col. 6, lines 42–43 and “alternatively run aerial image simulation” in Fig. 4, 2nd item); calculating a curvature of the light intensity in the area of the at least one edge segment (see col. 2, lines 46–47); and using the curvature of the light intensity to refragment the edge segments of the polygon (see col. 2, lines 47–49).

31. Mukherjee does not disclose expressly simulation of the layout that estimates light intensity.

32. Official notice is taken that simulation of the layout that estimates light intensity was well known at the time the invention was made in the analogous art of Aleshin et al., (Aleshin hereinafter), U.S. Patent 6,263,299. (See col. 5, lines 10–11).

33. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify “run aerial image simulation” as “simulation of the layout that estimates light intensity”.

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34. The suggestion/motivation to do so would have been to replace all the sides or vertices of each shape on the mask having a high radius of curvature with mask patterns having a smaller radius of curvature (see col. 2, lines 33–35).

35. Therefore, it would have been obvious to modify Mukherjee to obtain the invention as specified in claims.

36. Claims 2–5 and 9–12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukherjee as applied to claims 1 and 8 above, taken in view of Kazuya Kamon, (Kamon hereinafter), U.S. Patent 5,815,685.

37. As to claim 2, while Mukherjee discloses a method of preparing a circuit layout for OPC, Mukherjee fails to disclose a method wherein the refragmentation of the edge segments is performed by: increasing the density of the edge segments if the curvature of the light intensity calculated for an edge segment is greater than a predetermined threshold.

38. Kamon discloses a method wherein the refragmentation of the edge segments is performed by: increasing the density of the edge segments if the curvature of the light intensity calculated for an edge segment is greater than a predetermined threshold (see claim 19).

39. Claim 2 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the step disclosed in (claim 19) is functionally equivalent to the results produced by the step expressly claimed in Applicant's dependent claim 2.

Therefore, the "product" that is produced by performing the step disclosed in dependent claim 2 is the functional equivalent of the "product" that is produced in (claim 19).

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Although the “step” by which the end result is different, the final result for the “step” is identical.

40. Mukherjee and Kamon are analogous art because they are both related to OPC.

41. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the refragmentation of Kamon in the method of Mukherjee because Kamon provides light proximity effect correction for alleviating the deformation of patterns due to light proximity effects during production processes of an integrated circuit (see col. 1, lines 52–56), and as a result, Kamon reports the following improvement over his prior art: if it is detected that the correction amount for a certain data block is not within an allowable range, then such a data block may be extracted and stored in a separate file whereas the corrected data of the data blocks which have succeeded in obtaining a correction amount within the allowable range is output, this makes it possible to extract only those regions which need correction or have a too small process margin from an LSI pattern including a huge amount of data (see col. 19, lines 2–6 and 16–18).

42. As to claim 3, Kamon discloses a method wherein the refragmentation of the edge segments is performed by: calculating a curvature of the light intensity in the area of an adjacent edge segment (see col. 14, lines 55–57); and decreasing the density of the edge segments if the curvature of the light intensity calculated for adjacent edge segments is less than a predetermined threshold (see claim 19).

43. Claim 3 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the step disclosed in (claim 19) is functionally equivalent to the

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results produced by the step expressly claimed in Applicant's dependent claim 3.

Therefore, the "product" that is produced by performing the step disclosed in dependent claim 3 is the functional equivalent of the "product" that is produced in (claim 19).

Although the "step" by which the end result is different, the final result for the "step" is identical.

44. As to claim 4, Kamon discloses a method wherein the density of the edge segments is decreased by merging adjacent edge segments to create a larger edge segment (see col. 9, lines 15–22).

45. As to claim 5, Mukherjee discloses a computer readable medium including a sequence of program instructions recorded thereon that, when executed by one or more processors, cause the one or more processors to implement the method of any of claims 1-4. (See col. 9, lines 7–13).

46. As to claim 9, Kamon discloses a method wherein the simulation estimates the curvature of light intensity values in an area of each edge segment and the fragmentation of polygons is adjusted based on the curvature of the light intensity in the area around each edge segment (see col. 19, lines 45–54).

47. As to claim 10, Kamon discloses a method wherein the simulation estimates a gradient angle of light intensity and/or a slope of light intensity parallel to an edge segment of each edge segment and the fragmentation of the polygons is adjusted based on the estimate for each edge segment (see col. 16, lines 1–6).

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48. As to claim 11, Kamon discloses a method wherein the curvature of light intensity is estimated by calculating a rate of change in light intensity between adjacent points in the area of an edge segment (see col. 17, lines 30–36).

49. As to claim 12, Mukherjee discloses a computer readable medium that stores a sequence of program instructions that when executed by one or more computers cause the one or more computers to implement the method of any of claims 8-11. (See col. 9, lines 7–13).

### ***Conclusion***

50. Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

51. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan C. Ochoa whose telephone number is (571) 272-2625. The examiner can normally be reached on 7:30AM - 4:00 PM.

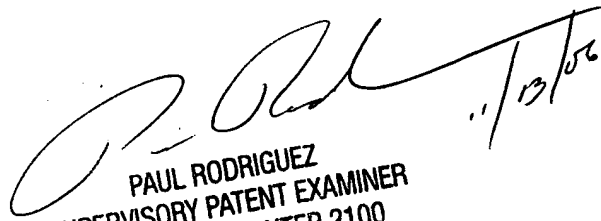
52. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

53. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

\*\*\* 11/13/06



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